

IN THE CLAIMS

Claims 1-19 (Cancelled).

Claim 20 (New): A magnetic memory device comprising:

a memory cell comprising a ferromagnetic double tunnel junction having a stacked structure of a first ferromagnetic layer, a first tunnel insulator, a second ferromagnetic layer, a first nonmagnetic layer, a third ferromagnetic layer, a second nonmagnetic layer, a stack of a soft magnetic layer and a fourth ferromagnetic layer, a second tunnel insulator, and a fifth ferromagnetic layer, which are stacked in the order recited,

the second and third ferromagnetic layers being antiferromagnetically coupled through a first nonmagnetic layer,

the third ferromagnetic layer and the stack of the soft magnetic layer and the fourth ferromagnetic layer being antiferromagnetically coupled through a second nonmagnetic layer,

magnetization of the first ferromagnetic layer and magnetization of the fifth ferromagnetic layer being pinned in the same direction, and

a magnetization direction of the second and the forth ferromagnetic layers and a magnetization direction of the first and the fifth ferromagnetic layers being substantially parallel or anti-parallel to each other when no current magnetic field is applied;

a bit line extending to a first direction; and

a word line extending to a second direction crossing the first direction.

Claim 21 (New): The magnetic memory device according to claim 20, further comprising a first antiferromagnetic layer arranged adjacent to the first ferromagnetic layer and a second antiferromagnetic layer arranged adjacent to the fifth ferromagnetic layer.

Claim 22 (New): The magnetic memory device according to claim 20, wherein the first and fifth ferromagnetic layers consist of a Co-based alloy or a three-layered film of a Co-based alloy, a Ni-Fe alloy and a Co-based alloy.

Claim 23 (New): The magnetic memory device according to claim 22, wherein a thickness of the Co-based alloy or the three-layered film of the Co-based alloy, the Ni-Fe alloy and the Co-based alloy is 1 to 5 nm.

Claim 24 (New): The magnetic memory device according to claim 20, further comprising a transistor or a diode corresponding to the memory cell, wherein the memory cells and the transistors or diodes are arrayed.

Claim 25 (New): A magnetic memory device comprising:
a memory cell comprising a ferromagnetic double tunnel junction having a stacked structure of a first ferromagnetic layer comprising two ferromagnetic films antiferromagnetically coupled through a non-magnetic film, a first tunnel insulator, a second ferromagnetic layer, a first nonmagnetic layer, a third ferromagnetic layer, a second nonmagnetic layer, a fourth ferromagnetic layer, a second tunnel insulator, and a fifth ferromagnetic layer comprising two ferromagnetic films antiferromagnetically coupled through a non-magnetic film, which are stacked in the order recited,
the second and third ferromagnetic layers being antiferromagnetically coupled through a first nonmagnetic layer,
the third and fourth ferromagnetic layers being antiferromagnetically coupled through a second nonmagnetic layer,

magnetization of the ferromagnetic film of the first ferromagnetic layer in a region in contact with the first tunnel insulator and magnetization of the ferromagnetic film of the fifth ferromagnetic layer in a region in contact with the second tunnel insulator being pinned in the same direction, and

a magnetization direction of the second and the fourth ferromagnetic layers and a magnetization direction of the first and the fifth ferromagnetic layers being substantially parallel or anti-parallel to each other when no current magnetic field is applied;

a bit line extending to a first direction; and

a word line extending to a second direction crossing the first direction.

Claim 26 (New): The magnetic memory device according to claim 25, further comprising a first antiferromagnetic layer arranged adjacent to the first ferromagnetic layer and a second antiferromagnetic layer arranged adjacent to the fifth ferromagnetic layer.

Claim 27 (New): The magnetic memory device according to claim 25, wherein the first and fifth ferromagnetic layers consist of a Co-based alloy or a three-layered film of a Co-based alloy, a Ni-Fe alloy and a Co-based alloy.

Claim 28 (New): The magnetic memory device according to claim 27, wherein a thickness of the Co-based alloy or the three-layered film of the Co-based alloy, the Ni-Fe alloy and the Co-based alloy is 1 to 5 nm.

Claim 29 (New): The magnetic memory device according to claim 25, further comprising a transistor or a diode corresponding to the memory cell, wherein the memory cells and the transistors or diodes are arrayed.

DISCUSSION OF THE AMENDMENT

The specification has been amended to describe the parentage of the application.

Claims 1-19 have been cancelled and Claims 20-29 have been added. Claims 20-24 are supported by Fig. 16 and the description thereof at page 44 of the specification. Claims 25-29 are supported by Fig. 17 and the description thereof at page 45 of the specification.

No new matter is believed to have been added. Claims 20-29 are now pending in the application.